Union Pacific Railroad Bridge
(Los Angeles and Salt Lake Railroad Bridge)
Spanning the Santa Ana River,
5 miles west of the City of Riverside
Riverside Vicinity
Riverside County
California

HAER No. CA-123

PHOTOGRAPHS

WRITTEN HISTORICAL AND DESCRIPTIVE DATA

Historic American Engineering Record
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HISTORIC AMERICAN ENGINEERING RECORD

UNION PACIFIC RAILROAD BRIDGE
(Los Angeles and Salt Lake Railroad Bridge)

HAER No. CA-123

Location:	Spanning the Santa Ana River, 5 miles west of the City of Riverside, Riverside Vicinity, Riverside County, California
Date of Construction:	1904
Type of Structure:	Railroad bridge
Designer/Engineer:	unknown
Fabricator/ Builder:	E.B. & A.L. Stone Company, contractors
Owner:	Union Pacific Railroad
Significance:	The Union Pacific Railroad Bridge was part of an overall plan initiated by Senator William Andrews Clark to connect the rail centers of Salt Lake City and Los Angeles, thereby creating a route of strategic importance for the shipping and transportation of materials. The Bridge was also, at one time, the largest concrete bridge on earth.
Project Information:	Documentation of the Union Pacific Railroad Bridge was completed by the Historic American Engineering Record (HAER), administered by the National Park Service, Department of the Interior, as part of the California Citrus Heritage Recording Project undertaken during summer 1991. For more information on this project refer to HAER No. CA-118 (California Citrus Heritage Recording Project, Riverside, Riverside County, California). Christopher Foord, HAER Historian, 1991 Christine L. Madrid, HAER Historian, 1993

HISTORY

Completed in 1904, this ten-arch concrete viaduct over the Santa Ana River in Riverside forms part of the old San Pedro, Los Angeles and Salt Lake Railroad Company's line from Salt Lake City, Utah, to the port of San Pedro in the Los Angeles district of Southern California. The bridge conforms to the mission style which was adopted for many of the structures on the line and, at the date of its construction, wes the largest concrete bridge in the world.

Senator William Andrews Clark, a mining speculator known as the "Copper King", was the main driving force behind the construction of the line. Clark had the vision to construct a line southwest from Salt Lake City to link up with the Los Angeles Terminal Railroad. This route would be of strategic importance not only as a transcontinental line, with light grades, wide curves and freedom from snows in the winter, but also as a local line, able to tap the rich traffic into Los Angeles and its seaport from the surrounding hinterland. A further benefit of this route to Clark was its proximity to the rich iron ore deposits of southern Utah and the abundant coal deposits in Carbon County, Utah.

Needless to say, Clark's proposed line was considered "counter to the economic interests of both the Southern Pacific and Union Pacific,"[1] who then began to revive their old plans to extend their own lines into southern California, previously abandoned due to disputes between the two companies. Clark persisted, however, and the San Pedro, Los Angeles and Salt Lake Railroad Company (SP, LA & SLRR) was incorporated on March 20, 1901. Construction began from both ends of the line.

Construction work in Southern California commenced in April 1901. Disputes between the SP, LA & SLRR and the Union Pacific (UP) railroad companies, which had begun work on extending its Oregon Short line into Southern California, had resulted in the suspension, in November 1901, of all construction work in Nevada. After realizing the impossibility of operating two independent lines profitably between Salt Lake and Los Angeles, Clark reached an agreement with Edward Henry Harriman of the UP to merge and complete the construction of a line between Salt Lake City and Southern California. Under the agreement of July 9, 1902, Clark sold to Harriman fifty percent of the SP, LA & SLRR. Construction of the line in Nevada resumed on July 8, 1903.

The line was completed January 20, 1905, with the first regular passenger service beginning shortly thereafter on May 1. The corporate name of the SP, LA & SLRR was shortened to the Los Angeles and Salt Lake Railroad Compeny (LA & SLRR) on August 16, 1916. The UP finally bought the remaining fifty percent of the LA & SLRR by April 27, 1921, running the line under the same name until January 1, 1988, when the LA & SLRR was formally merged into the UP Railroad.[2]

From the beginning, Clark stipulated the highest standards for the construction of the line.[3] These standards are reflected in the 984'-long concrete arched viaduct across the Santa Ana River, five miles west of the city of Riverside. The contract for the construction of this bridge was given to E. B. & A. L. Stone Co. of Oakland, California,[4] and work began on December 17, 1902.

The viaduct is 17' wide, about 55' high and made up of eight 86-foot-span arches each with a radius of 43.5' and a rise of 36.9'. feet. At each end, a 38'-6" arch connects the abutment piers to the retaining wall approaches. All of the piers are founded on granite bedrock, which involved sheet piling into the bed of the river and then removing the sand and gravel using suction and dredge pumps. Bedrock was reached et between 10' and 50' below water level. The flow of underground water, however, caused considerable problems for the contractors, who did not have adequate centrifugal pumps for the job. This hindered considerably the excavation of the pier pits and led Charles M.

Dodge, the Salt Lake Railroad's bridge inspector, to criticize the management of the E. B. & A. L. Stone Co. as "apparently incompetent".[5] On 23 July, 1903, Dodge writes in his daily report that the "foreman in charge of pile driving...was not in condition to be accurate."[6] Years later Dodge admitted to his nephew Calvert Erwin that the foreman was ectually drunk on the job.[7]

Each stream pier stands on a 16' x 28' concrete footing and is 9' x 21' at the spring line. The piers themselves were cored out in the center, above the spring line, as a means of saving weight and materials. The 10"-thick deck of the bridge is supported by four spandrel walls, the two internal ones being connected by a cross wall. The outer spandrel walls ere 3' thick and rise 2'6" above the crown of the arch, above which is a 15" coping and a 3'-high parapet wall. The main arches are 42" thick at the crown.

Local cement and gravel was used for the foundations, piers and spandrels, in the proportion of 1 to 11. For the arch rings crushed lime rock end foreign cement in the proportions of 1 to 2 to 4.5 was used. For the coping and parapet walls standard Portland cement and gravel in the proportion of 1 to 7 was used. In total, 14,000 cubic yards of concrete were used in the construction of the viaduct. The gravel was washed on site using a 6" dredge pump. Three Ransome concrete mixers located at the west end of the viaduct were used to mix the concrete. A narrow gauge railway took the mixed concrete in half yard cars over the viaduct. A switching track for empty cars allowed an almost constant flow of concrete. Steam power was used to haul the cars and bucket elevators were used to transport material. The forms for the concrete arches were made of rough lumber; the concrete was placed in wet and shovel tamped down.

At least 50 men were employed during the initial phase of construction, which included some Mexican laborers used for concrete work, although this made the "communication of orders difficult."[8] Most of the workers were housed in a bunkhouse style structure of lumber and tar paper.[9]

The construction of the bridge did not go smoothly. There were numerous delays due to lack of steam power and pumps, which made excavating when the weter level was high virtually impossible. Dodge blamed the management, and at one point the chief engineer of the SP, LA & SLRR, C. A. Hawgood, intervened and directed the work himself.[10] The bridge also claimed a life. A man was injured, and within 24 hours died, when the centering of en arch unexpectedly fell while being taken down. Despite these problems, by January 9, 1904, the temporary track across the viaduct was completed and the first train crossed at 2:00 p.m. By February 18, 1904, the ballasting was completed and the work of the finishing details left undone by the contractor was begun.[11]

When completed, the viaduct was the longest concrete structure in the world. Today, it still stands, straddling the Santa Ana River as a great monument in the landscape to the importance and impact of railroads in the development of Southern California.

ENDNOTES

1. J. R. Signor, The Los Angeles and Salt Lake Railroad Company (San Morino, CA: Golden West Books, 1988), p.25.

2. Ibid., p. 223.

3. Ibid., p.25.

4. The Railway and Engineering Review, 10 October 1903, p.730.

5. SP, LA & SLRR Co., Bridge Inspector's Report on the construction of the Santa Ana Viaduct, January 1903 to January 1904, P.1

6. Ibid. p. 2.

7. Tom Patterson, "Big Bridge Job Had Problems with Quicksand," Riverside Press-Enterprise, 8 January 1967. [clipping on file at Riverside Public Library, Local History Collection, "RIV CITY - Bridges"]

8. SP, LA & SLRR Co., Bridge Inspector's Report, p. 1.

9. Patterson, "Big Bridge Job," 8 January 1967.

10. SP, LA & SLRR Co., Bridge Inspector's Report, p. 2.

11. Ibid., pp. 2-3.